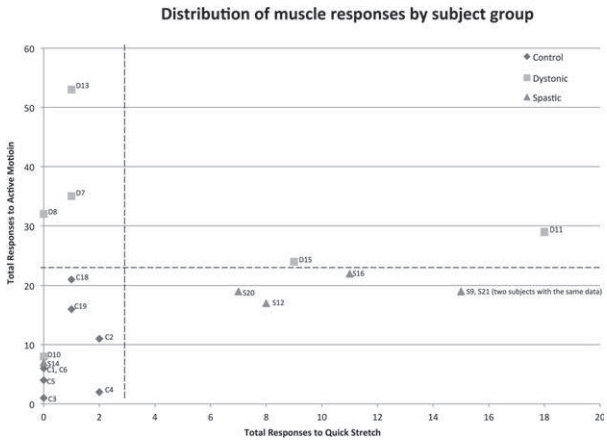


**Figure 5:** Distribution of muscle responses by subject group.

($p$=0.055), quick stretch ($p$=0.007), and movement initiation ($p$=0.002).
*Conclusions:* EMG data collected with this protocol can help the clinician distinguish spastic from dystonic hypertonia.

## D7
## The relationship of secondary dystonia and choreoathetosis with activity, participation and quality of life measures in children with dyskinetic cerebral palsy

E MONBALIU, P DE COCK, L MAILLEUX, E ORTIBUS, K KLINGELS, H FEYS
*KU Leuven, Leuven, Belgium*

*Background/Objectives:* To date, little information is available as to how, and to what extent dystonia and choreoathetosis affect the functional activity, participation and quality of life in children with dyskinetic cerebral palsy (CP). Yet, the primary goal of therapeutic interventions is to enhance the child's ability to perform activities in the context of daily life, which are closely related with participation and quality of life (QOL). Therefore, knowledge of the impact of secondary dystonia and choreoathetosis on the different levels of the ICF model and QOL is important to guide treatment interventions. The objective of this study was to determine the relationship between dystonia and choreoathetosis and the level of activity, participation and quality of life in children with dyskinetic CP.
*Design:* cohort study (correlational).
*Participants and setting:* This study included 54 participants with dyskinetic CP (mean age 14y 6mo, SD 4y 2mo), recruited from five Belgian Flemish special education schools for children with motor disabilities.
*Methods:* Dystonia and choreoathetosis were measured with the Dyskinesia Impairment Scale (DIS). Activity measures included the Gross Motor Function Measurement (GMFM-88), the Functional Mobility Scale (FMS), the Jebsen-Taylor Test of Hand Function (JTT), and the Abilhand-Kids Questionnaire (ABIL-K). The Life Habits Kids (LIFE-H) was used as a measure for social participation. For quality of life, the Quality of Life Questionnaire for children with CP (CP-QOL) was applied. Spearman's rank correlation ($r_s$) was used to assess the relationship between both motor disorders and the activity, participation and quality of life measures.
*Results:* Significant moderate to good correlation coefficients were found between dystonia and the activity scales with $r_s$ varying between −0.64 and −0.71. Fair correlations coefficients were found with the LIFE-H ($r_s$=−0.42) and the CP-QOL ($r_s$=−0.32). For choreoathetosis, no or only weak relationship was found with the activity, participation and quality of life scales.
*Conclusions:* This study is the first to examine the relationship between dystonia and choreoathetosis in children with dyskinetic CP and their activity abilities, participation and quality of life. A strong relationship was found between the presence of dystonia and activity scales. Similarly, considerable association was found with participation and quality of life scale, although into a lesser extent. For choreoathetosis, little or no relationship was found. These findings seem to suggest that it might be most crucial to focus on dystonia reducing intervention studies.

## D8
## Muscle strength after botulinum neurotoxin injection in children with cerebral palsy

MN EEK, M PÅHLMAN, K HIMMELMANN, B ASKLJUNG
*Regional Rehabilitation Centre, Gothenburg, Sweden*

*Background/Objectives:* Spasticity is a common problem in children with cerebral palsy (CP), which can affect motor development. Botulinum neurotoxin injection (Btx) can be used to reduce spasticity. The drug effect is maximal after 4 to 6 weeks and lasts about 3 months. Muscle weakness has been reported, but we have found only one study that has measured muscle strength (Bjornson et al 2007), showing an increase 24 weeks after injection. The reports are conflicting and it is not fully known how Btx affects voluntary muscle strength. Muscle weakness is common in children with CP and has been shown to correlate with walking ability (Eek et al 2008). The aim of the study was to follow muscle strength, before and after injection with Btx, in children with CP.
*Design:* Prospective cohort study.
*Participants and setting:* Children were recruited consecutively from the spasticity clinic at the Regional Rehabilitation Centre in Gothenburg, Sweden. Twenty-three children with spastic CP, able to walk without support, were recruited. Three were lost to follow up, resulting in 20 children included, eight girls and 12 boys, 4 to 13 years old (mean 7.7). Sixteen children had unilateral and four bilateral involvement. Btx injection was made in the gastrocnemius muscle in 24 legs.
*Methods:* Measurement of muscle strength in plantar flexors was made with a handheld device. Lever arm was measured with a tape measure, torque was calculated and normalized to body weight (Nm/Kg). Muscle strength was compared before Btx, at peak effect and when Btx has leveled off. Not treated muscles served as control to treated muscle groups. Gait